

**SUBJECT : POWER ELECTRONICS**

Time: Three Hours

Full Marks: 100 (50 each part)

**Use a separate Answer-Script for each part**

Question No.	PART - I	Marks
	Answer any Three questions	<b>TATE</b>
	<b>Two marks are reserved for neat and well organized answer.</b>	
1.	a) Write a short notes on Schottky diode.	4
	b) Classify power diodes according to their reverse recovery time.	4
	c) Show how average power loss in a power diode is calculated from its V-I characteristic ?	8
2.	a) State the main characteristics of a power BJT.	6
	b) State the important parameters of power MOSFET.	6
	c) Why power MOSFET can not block any reverse voltage ?	4
3.	(a) Explain the working principle of an IGBT with the help of its equivalent circuit.	8
	(b) State the important characteristic of power MOSFET.	8
4.	(c) Explain the working principle of a step up chopper using the relevant circuit and necessary wave.	8
	a) The input of a step down chopper is 140 volts and is feeding a resistance load of 8 ohms. What is the duty ratio if the load current is 30A ? What is the blocking voltage of the chopper ?	8
5.	a) Explain the working principle of a full bridge inverter with the help of necessary circuit and relevant waveform.	8
	b) Explain the working principle of a Buck-Boost chopper using necessary circuit diagram and also derive the expression of its output voltage.	8

**BACHELOR OF ENGINEERING IN  
ELECTRICAL ENGINEERING (EVENING) EXAMINATION, 2019 (OLD)  
(4th Year, 1st Semester)  
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**PART-II**Answer *any three* questions*Two marks* are reserved for neatness and well organized answer script

1. a) Explain the operation of a three phase half wave rectifier circuit with resistive load R and obtain the following:  
Average output voltage, RMS output voltage, form factor, voltage ripple factor, transformer utilization factor and PIV. 10
- b) A single phase 230 V, 0.5 kW heater is connected across 230 V, 50 Hz supply through a diode. Calculate the power delivered to the heater element. find also the peak diode current and input power factor. 6
2. a) Explain the operation of a single phase half wave converter feeding a RL load. Give necessary circuit diagram and waveforms. Also explain the operation of above converter in the presence of a freewheeling diode across the load. 12
- b) Draw the output voltage and current waveform of single phase half-wave diode rectifier circuit with inductive load L. 4
3. a) A three phase half wave rectifier operates from a line voltage supply of 400Vrms. A resistive load of  $20\Omega$  is connected at the output of the rectifier. Calculate the average and rms current through the load. 6
- b) Briefly explain the operation of three phase full wave converter with resistive load with necessary circuit diagrams and operation. 10
4. a) Explain the operation of a Single Phase Full Wave Bridge Converters with R-L Load. Draw the output voltage and current waveforms. 6

- b) SCR with peak forward voltage rating of 1000 V and average on state current rating of 40 A are used in single phase midpoint converter and single phase bridge converter. find the power that these two converters can handle. Use a factor of safety 2.5. 10
5. Write short notes on the following 8×2
- a) Single phase, mid-point type step down or step up cycloconverter
- b) Single phase semi converter with RLE load

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